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Disciplines

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The published version of this Working Paper may be found in the 1998 publication: *Living with Defined Contribution Pensions*.

Living with Defined Contribution Pensions

Remaking Responsibility for Retirement

Edited by

Olivia S. Mitchell and Sylvester J. Schieber

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Part III

Retirement Policy and Defined Contribution Plans

Chapter 11

The Importance of Variable Annuities in a Defined Contribution Pension System

P. Brett Hammond

Variable annuities are an increasingly popular retirement vehicle in the U.S. A variable annuity is a mechanism by which a person's current savings can be turned into a future retirement income (i.e., transfer assets from the present to the future). Often tax-advantaged, a variable annuity is one of two major classes of annuities that provide insurance against financial insecurity in retirement by pooling the assets of many savers and then paying a lifetime or long-term income to people in the pool based on the size of their assets and mortality expectations. The other annuity class—the *fixed* annuity—also offers insurance features, but a fixed annuity differs from a variable annuity in that it *guarantees* to preserve principal and provide a modest return (by law, at least 90 percent of principal plus 3 percent per annum) based on savings invested in assets such as bonds, mortgages, and real estate held in an insurance company's general or separate account (i.e., not marked to market).

Variable Annuities and Mutual Funds

A variable annuity is like a mutual fund in that it does not guarantee the principal or a return. Rather it is a fund that pools individuals' savings and gives them a variable return on those savings, depending how well the underlying investments perform minus various management fees. Like a mutual fund, a variable annuity enables individuals to obtain the benefits of a professional investment manager, who is supposed to reduce risk and increase overall returns by spreading their savings among a variety of stocks or bonds purchased on their behalf.

But an annuity differs from a mutual fund in that it provides insurance

TABLE 1 Characteristics of Variable Annuities vs. Mutual Funds, 1995

	<i>Stand alone product</i>		<i>Held inside qualified plan or IRA</i>	
	<i>Variable annuities</i>	<i>Mutual funds</i>	<i>Variable annuities</i>	<i>Mutual funds</i>
Tax Status of contributions	Taxed	Taxed	Most are deferred	
Tax Status of accumulations	Deferred	Taxed	Deferred	
Tax Status of distributions	Earnings taxed	Exempt	Taxed	
Major emphasis	Income	Savings	Income	Savings
Annual contribution limit	No	No	Yes, Varies	
Availability of fixed rate fund	Yes	No	Yes	No
Investment management fees average*	0.79%	1.30%	0.79%	1.30%
Annuity/insurance fees average*	1.27%	None	1.27%	None
Commissions	Common	No	Common	No
Actuarial & investment guarantees	Some	No	Some	No
Front-end or sales charges	Rare	Some	Rare	Some
Early withdrawal penalties	Yes	No	Yes	No
Exit penalties/surrender charges	Common	Rare	Common	Rare
Can be annuitized at retirement	Yes	Must be cashed in	Yes	Must be cashed in
Regulation	SEC; state insur. depts.	SEC	ERISA agencies; SEC; state insur. depts.	ERISA agencies; SEC

Source: Lipper (1995)

with two parts or phases. In the first, or accumulating phase (a *deferred* annuity), typically, a percentage of an employee's before-tax salary is paid by him or her (or, on the employee's behalf, by the employer) as a periodic premium into an annuity that may offer certain guarantees, such as a guaranteed death benefit, and impose certain restrictions, such as surrender charges. In the second, or retirement phase (an *immediate* or *payout* annuity), a person uses her accumulated savings to purchase a lifetime or long-term income through an annuity that offers a significant additional form of insurance not found in a mutual fund, namely a way to receive a guaranteed term or lifetime retirement income through pooling the savings and the mortality risk of many retirees. An insurance company can guarantee income to a large number of annuity purchasers, because some individuals die before getting back the full accumulated value of their variable annuity investment while others live longer than average and receive much more than the accumulated value of their variable annuity investment. In this sense, annuities may be classified as either group (employer-sponsored tax-qualified) or individual (individually purchased qualified or unqualified) annuities, but in practice, the distinction between group and individual annuities isn't always clear (Gentry and Milano 1996). Somewhat more distinct — and similar to mutual funds when used as retirement vehicles — is the difference between qualified and unqualified annuities. Qualified annuities shelter all contributions and earnings from taxes until they are withdrawn. Nonqualified annuities require taxes to be paid on contributions, but not on subsequent earnings until they are withdrawn. Table 1 compares the significant features of variable annuities and mutual funds.

Mutual funds and variable annuities are not mutually exclusive. A person can invest after-tax or before-tax savings in a qualified-plan mutual fund or accumulating annuity and then at retirement remove those savings plus the earnings in order to purchase an immediate payout annuity. Moreover, variable annuities can be based on mutual funds; that is, variable annuity savings can be invested in mutual funds and pooled along with non-tax-deferred savings of other investors.

Growth and Size of Variable Annuities

Variable annuities are an increasingly popular retirement vehicle for Americans. Although there is some disagreement about what proportion of the annuity market is held in variable assets as opposed to fixed assets (e.g., Krawcheck and Hicks 1995 vs. *National Underwriter* 1996), variable annuities are now believed to be over \$400 billion of the more than \$650 billion in total annuity assets (*National Underwriter* 1996, p. 3). This compares to over \$4 trillion of financial assets held in public and private

TABLE 2 Changes in the Variable Annuity Market over Time, 1975–95

	1975	1980	1985	1990	1995	Annualized growth rate (%)
Variable annuity sales (millions)			5.3	17.3	51.5	28.9
Fixed annuity sales			23.6	47.8	47.3	8
Number of companies offering variable annuities	5	6	34	73	104	
Number of variable annuity policies	5	9	47	105	244	
Number of variable annuity accounts	14	27	198	624	2575	

Source: LIMRA (1995), sales; Morningstar (1995), numbers.

pension plans in 1992 (EBRI 1995, p. 190). Variable annuity assets grew by about 300 percent between 1990 and 1995, while the broader, more visible mutual fund market (about \$2.75 trillion at the end of 1995) increased by about 150 percent during that time. Perhaps reflecting the stock market runup, variable annuity purchases reached an all-time high of \$52.5 billion in 1995, up from \$4.5 billion in ten years (*National Underwriter* 1996, p. 14). Table 2 shows sales growth from 1985 to 1995 for variable and fixed annuities (a portion of this reported growth may be accounted for by rollovers from one annuity to another). Growth in non-tax-qualified variable annuity sales has averaged 48.2 percent per year since 1985, compared with 23.4 percent per year for tax-qualified variable annuities. Flows into the mutual fund market totaled \$300 billion in 1995, some of that via variable annuities using mutual funds as investment vehicles.

Growth in the institutional capacity of the variable annuity industry also has been spectacular, as illustrated by Table 2, which shows changes since 1975 for several indicators, including the number of variable annuity companies, policies, and separate accounts. Table 3 shows the 35 largest variable annuity providers in the United States along with the nonfixed, nonguaranteed variable annuity assets they manage. In comparison, the mutual fund industry has grown to over 5,000 funds (Hurley et al. 1995). But in the 401(k) market, traditionally thought of as the province of mutual funds, as much as about 40 percent of large plan assets are held by insurance companies (Goldstein et al. 1995). Of course, insurance companies may offer mutual funds and mutual fund companies may offer or have ties to variable annuity products.

Recent analysis suggests that the investment management industry—in particular, variable annuities and mutual funds—could experience

TABLE 3 35 Largest Variable Annuity Providers by Assets, 1995

<i>Rank</i>	<i>Insurance company</i>	<i>Total assets in variable annuity accounts (\$ millions)</i>
1	College Retirement Equities Fund (CREF)	79,250.58
2	Hartford Life Insurance	19,937.43
3	Lincoln National Life Ins.	14,566.00
4	IDS Life Insurance	12,486.05
5	Nationawide Life Insurance	11,141.10
6	Allianz Life Ins of North Amer	7,700.23
7	Equitable Life Assur Soc of US	6,930.50
8	Prudential Ins of America	6,643.90
9	Anchor National Life Insurance	5,484.70
10	North American Sec Life Ins	5,128.63
11	Sun Life Assur of Canada (US)	5,075.63
12	Fidelity Investments Life Ins	4,421.80
13	American Skandia Life Ins	4,111.22
14	Merrill Lynch Life Insurance	3,941.59
15	Travelers Insurance	3,740.68
16	Variable Annuity Life Ins Co	3,536.24
17	Metropolitan Life Insurance	3,451.21
18	Guardian Insurance & Annuity	3,379.01
19	Aetna Life Insurance & Annuity	3,229.61
20	John Hancock Mutual Life Ins	3,088.03
21	Massachusetts Mutual Life Ins	2,962.35
22	Lutheran Brotherhood Var Ins Prod	2,677.91
23	SMA Life Insurance	2,605.48
24	Phoenix Home Life Mutual Ins	2,056.26
25	Western Reserve Life Assur of OH	1,933.01
26	Security Benefit Life Ins	1,810.32
27	Life Insurance of Virginia	1,738.30
28	MONY Life of America	1,668.05
29	Kemper Investors Life Insurance	1,641.74
30	Providian Life & Health Insurance	1,479.06
31	Fortis Benefits Insurance	1,380.83
32	New England Mutual Life Ins	1,168.32
33	Connecticut Mutual Life Ins	1,085.30
34	United Investors Life Ins	1,055.55
35	Mutual of America Life Insurance	956.50
Total for 104 companies		255,000.00

Source: Morningstar (1995)

slower growth in the near future (Krawcheck and Hicks 1995; Hurley et al. 1995), perhaps because the baby boom won't start entering its peak annuity purchasing years for another ten years. If the baby boom behaves like its predecessors, however, the long-term growth prospects for variable annuities are positive.

An Era of Individual Choice

The unique characteristics, market size, and growth in recent years of variable annuities are alone enough to justify a close examination of their place within the pension system, but it is the rush toward individual freedom and responsibility for retirement in America that compels a closer examination of the use of variable annuities. For example, in contrast to traditional defined benefit plans, defined contribution plans require a high degree of employee rather than employer responsibility. Overall growth in employer pension plans over the past decade can be entirely attributed to an increase in the number of defined contribution plans that has more than offset a decline in the number of defined benefit plans (USDOL 1996, p. 59). Some observers attribute this to changing employer and employee preferences, while others cite contrasting legal and regulatory treatment of defined benefit and defined contribution plans (Warshawsky 1995; Gentry and Milano 1996). In either case, the proportion of workers covered by some kind of defined contribution plan has increased dramatically in the past two decades (EBRI 1994b).

Although the trend toward greater individual responsibility for retirement security is clear, not all plan participants treat the attendant freedoms similarly. Bernhein, elsewhere in this volume, has shown that individuals' financial knowledge is far from extensive. In response to a poll (EBRI 1994a), over a third of employees say they would spend their defined contribution accumulation or put it in a personal savings account rather than transfer it to a new plan if they changed employers. More than half would do so if the sum was small or they lost their job.

Major U.S. national policy changes and proposals promise further to devolve control of retirement savings into the hands of individuals. Calls to privatize the social security system through the use of individually directed investment accounts are growing more numerous and are attracting considerable attention (SSAC 1997). Recent legislation (H.R. 3448, Small Business Job Protection Act of 1996) aims to protect Americans in an era when workers can expect to change jobs during their careers by strengthening pension portability and reducing the legal and regulatory distinctions among types of defined contribution pensions. The consequences of any policies that would increase individual responsibility for retirement are only amplified by demographic changes that have and will occur over the next 20 years (Biggs 1994; Shoven 1995).

At the same time, the Department of Labor has issued regulations requiring employers to improve defined contribution pension savings and investment education (USDOL 1995). Although Clark and Schieber (this volume) show that education programs can affect individual pen-

sion investment choices, it remains to be seen whether such programs will ensure adequate retirement income in retirement for all or most employees.

Indeed, the crucial pension policy issue most relevant to variable annuities is how much of a person's retirement savings and accumulations ultimately becomes available to support a retirement income stream. Reductions in retirement savings for whatever reason, either through reduced savings rates or through removing assets from retirement savings, thereby reduces the future retirement income stream and runs the risk of leaving a retiree with insufficient income. There have always been opportunities for people covered by certain defined benefit and defined contribution plans to remove retirement savings when they leave a job. But solid statistics on the proportion of people or funds that disappear from tax-sheltered and taxable retirement savings are hard to come by. With changes in the tax laws in the 1980s, penalties for taking cash from certain types of plans were increased, but as the experience of TIAA-CREF will show, sufficient avenues remain for persistent people to get at their retirement assets prior to retirement.

In light of these important issues, what viable experience is available for better understanding how defined contribution pension systems do or should work in an era of individual responsibility? Considerable attention has been paid to the savings side of the individual retirement responsibility equation, but not to the income side. Recent reforms and education campaigns have promoted incentives and education for increased retirement savings, the power of regular investments and compounding, time diversification, portfolio construction and allocation, and other issues associated with preretirement savings and investment.

Such a focus is most appropriate when considering issues such as the inadequate national savings rate and the long lead time needed for accumulating sufficient retirement savings under defined contribution plans. But concerns about retirement savings need to be matched with concerns about retirement income and other arrangements. We need to focus on (1) savings as they affect retirement payouts and (2) retirement income design and adequacy. In this vein, more attention should be given to variable annuities as a model for individual retirement security and national retirement security policy.

The rest of this chapter uses the variable annuity experience to examine the following questions:

What policies are necessary to insure adequate retirement income in a defined contribution system?

How should Americans choose to receive retirement income?

How can we educate Americans to make the “right” choices?

What should workers pay for management of their retirement funds, both before and after retirement?

What is the best way to insure pension portability?

How does the variable annuity experience inform current and proposed policy reforms that continue to shift responsibility for retirement security to individuals and their families?

This chapter addresses these questions by examining in depth the experience with variable annuities at TIAA-CREF, the company that invented the variable annuity and that is still the world's largest provider of them.

TIAA-CREF's experience argues that national retirement security policy—particularly policies for defined contribution pension systems and proposals for Social Security reform—should not lose sight of the full spectrum of the retirement life cycle: retirement income arrangements as well as retirement savings and accumulations. As such, national policy should continue to encourage and support payout annuities that ensure an adequate income over a worker's retirement life.

Variable Annuities and TIAA-CREF

TIAA-CREF invented the modern variable annuity in 1952 and is now the world's largest private pension and variable annuity provider. The invention of the variable annuity was the culmination of several decades of development of a defined contribution pension system for higher education starting in 1905 (this history is provided in Greenough 1990). In that year, prior to the founding of the Teachers Insurance Annuity Association (TIAA) in 1918, Andrew Carnegie established a \$15 million revolving fund (a “free pension system”) that was used to provide a retirement income for each faculty member at 96 colleges and universities. His gift recognized that higher education had difficulty attracting and keeping faculty with the low salaries and lack of benefits then prevailing. This grant led to creation of the Carnegie Foundation, which, among other responsibilities, provided faculty who attained age 65 a retirement benefit of \$400 plus half of the faculty member's final salary. Unfortunately, this defined benefit plan quickly failed, because liabilities exceeded assets during a period of rapid salary increases and because the plan did not foresee the large number of eligible faculty and their widows.

Consequently, the Carnegie Corporation sought advice on a retirement system for higher education that could remain solvent. In 1917, an independent commission called for creation of an insurance company established under the laws of New York. In response, the nonprofit

Teachers Insurance and Annuity Association of America (TIAA) was founded in 1918 with a grant of \$1 million from the Carnegie Corporation; it was chartered to provide pensions to serve the education and research communities based on a system of individual annuities invested in fixed assets.

Other features of the system, many of which were new then but now in widespread use, included full funding, contractual rights for policyholders, multiple employers and portability (to allow movement by faculty among employers), full and immediate vesting, no cash values, contributions on the part of participants, and nonagency, low-cost distribution. These elements allowed the company to insure pensions for faculty for more than two decades based on fixed accumulating and payout annuities.

What led TIAA to consider other pension options was post World War II inflation. Before 1940, rising investment income and the increasing number of new faculty followed by falling prices in the 1930s allowed TIAA to provide an adequate income for its retirees. World War II's aftermath—and those of later wars, hot and cold—helped transform inflation into a serious permanent concern. In the late 1940s, inflation increased and coincided with a steep rise in salaries as well as the first big wave of faculty retirements. These new retirees had spent most of their careers at lower salaries covered by TIAA fixed annuities whose investments were based primarily on corporate bonds held to maturity and real estate. This group found that fixed retirement annuity benefits could not keep up with rapidly rising inflation. Even benefits based on many years of service were low. Fixed annuity rates had remained relatively high during the Depression but had declined after the World War II, and contributions of newly retired faculty had of course been based on many years of low preinflation salaries. As a result, retirement benefits as a proportion of preretirement salary dropped substantially for most faculty in the immediate postwar period. Many colleges and universities felt obliged to supplement fixed income annuity benefits with additional payments.

By the early 1950s, the difficulties posed by simultaneous high inflation, low interest rates, and low benefits, prompted TIAA to re-examine the role of traditional annuities in defined contribution plans. Other pension providers were faced with similar circumstances, but in the case of defined benefit plans, employers rather than employees faced the challenge of meeting the promises they'd made with eroding real assets and revenues.

Under William C. Greenough, then TIAA vice president, the company launched studies to discover how an annuity plan could respond more effectively to a variety of investment and inflation conditions. By tracing

the performance of common stocks over the previous 70 years, a TIAA study team found the key: a completely new instrument—christened a variable annuity—with a 100 percent equity investment base. The resulting separate legal, actuarial, and investment entity was called the College Retirement Equities Fund, or CREF (Greenough 1951).

Greenough's 1951 report proposing the variable annuity sought a way to "overcome some of the troubles inflicted by inflation" and concluded that adding an annuity plan investing in a broad range of common stocks over the period studied—1880 to 1950—would have provided better returns and better purchasing power than from fixed income investments over most periods:

This economic study should result in a basic change in planning retirement systems in the future. The factors of inflation and deflation have pretty generally been disregarded in past planning, with unfortunate results. This study shows that common stock would have provided better returns than those available from fixed-income investment in most periods. (Greenough 1951, p. 6)

Variable annuities are so common today that it is hard to realize that they were a new invention in 1952. Common stock and mutual fund ownership by individuals was not nearly as widespread as it is today, especially in the aftermath of the Depression. This may have prompted some powerful insurance industry interests initially to oppose the concept.

Almost as important an invention as CREF itself was the education initiative that went with it. Meetings with educational associations, college boards of trustees, college administrators, and TIAA participants, all aided substantially in introducing and supporting the new variable annuity.

Plan Design and Individual Choice

CREF's creation represented a truly significant expansion of investment choice for retirement savers and annuitants. TIAA-CREF was the first to offer to its plan participants the option of choosing how much of their premiums to allocate to the fixed-annuity account and how much to the new variable annuity. And on retirement, annuitants faced a similar choice about what proportion of their retirement income they wished to receive from the fixed or the variable account. Along with new choices, retirement savers and annuitants also faced new risks, because neither their principal nor their earnings were guaranteed in exchange for the possibility of greater returns on equities purchased through variable annuities.

Expansion of choice has continued in the TIAA-CREF system. Since 1988, the company introduced a number of new options for accumulat-

ing participants and retired annuitants. On the investment side, colleges and universities were given the chance to offer their employees more options: a money market account, an account for corporate bonds, then global, growth, and indexed equities accounts, and a social choice account. Finally, in 1995 TIAA introduced a separate account for real estate. On the payout side, as new accounts were added to CREF for premiums and accumulations, they were also added as options for payout annuities as well.

Traditional Lifetime Annuity Options

To accommodate different family situations and preferences for receiving retirement income, TIAA-CREF now provides a variety of annuity income options. Annuitants may select a one-life option, that provides to the annuitant an income for life, or a two-life option, that provides an income for both the primary annuitant and a second annuitant (e.g., a spouse) for both lifetimes. Under the two-life option, there are some additional choices. For example, upon the death of one of the annuitants, the annuity can be designed to pay the remaining annuitant a full benefit or two-thirds of the original benefit. In addition, for both one-life and two-life annuities, retirees can add to lifetime benefits a guaranteed period (10, 15, or 20 years).

TIAA-CREF also offers different payment methods. Under the TIAA standard payment method, an annuitant's first year's income is based on a full payout dividend rate that reflects current TIAA investment earnings (recently this has been about 7 percent). Subsequent income will continue to reflect total TIAA earnings, that can vary from year to year (changes in payout rates are made by the TIAA Board of Trustees). This continues for the life of the annuity. The CREF payment method is similar, but initial annuity income is set at an assumed investment rate of 4 percent. Again, depending on investment performance in comparison with the 4 percent assumed rate, subsequent income is periodically adjusted up or down. To supplement the CREF and TIAA standard payment methods, in 1982 the company introduced the TIAA Graded Payment Method. Under this method, annuity payments in the first year are based on an assumed interest rate of 4 percent—higher than the TIAA minimum 2.5 percent guarantee, but lower than the total interest rate used for the TIAA standard method. This assumed interest rate is less than the full anticipated rate to allow for increases in which a portion of each year's earnings are added to the "annuity reserve" (which can be thought of as assets) in order to purchase additional annuity income for the following year. The remainder is paid as current income. The proportional benefit increase each year is close to the difference between a 4

percent rate and the total interest rate earned. Thus, new retirees face a choice between higher initial income through the TIAA standard method or a better chance at inflation protection but lower initial income through CREF or the TIAA graded method.

Alternatives to Traditional Lifetime Annuities

More recently, the pension plan introduced several additional options for obtaining retirement income and direct cash prior to or in lieu of a lifetime or long-term payout annuity in response to changing tax and benefit laws and to participants' expressed desires. The following alternatives are governed by a wide variety of laws, regulations, institutional rules, and TIAA-CREF policies:

Minimum distribution option (MDO). In response to 1980s legislation that affected private sector pension accumulations and payouts, TIAA-CREF has since 1991 offered MDO, which is a temporary or permanent substitute for a traditional annuity that allows an individual reaching age 70½ to take a required minimum payment each year based on the size of his or her accumulation and an actuarial calculation specified in the tax regulations.

Transfer payout annuity (TPA). This allows an individual to transfer funds from the fixed annuity TIAA account in equal amounts over a 10-year period either to a CREF account, to another company's retirement account, or directly to the individual as a cash payment.

Cash withdrawals. Subject to the employer's rules, withholding, taxes, and, in some cases, IRS penalties, a higher education employee, after leaving a job, may take a cash withdrawal from his or her tax-deferred group annuity account after age 59½. For example, a former employee over the age of 59½ who takes a cash withdrawal will pay income taxes on the amount in the year in which the payment is made. In contrast, if that employee had chosen to annuitize those same funds, she would pay income taxes only on the amount received each year (possibly at a lower rate, since each yearly payment would be smaller than the full cash withdrawal). Institutions in higher education have set a wide variety of rules for their employees in this area, but of approximately 5,500 participating institutions in TIAA-CREF, only about 700 prohibit any sort of cash. Even in those cases, individuals can obtain cash from their own voluntary supplemental annuities (known as SRAs or TDAs).

Transfers and rollovers. Under certain circumstances, participants may transfer some or all of their accumulations to another retirement funding vehicle or roll their savings over to an individual retirement account (IRA). Transfers continue to be treated as retirement funds. IRA ac-

counts are not subject to withholding imposed on direct cash withdrawals and can, therefore, be used in a two-step process to obtain cash.

Loans. Similarly, employees may take loans against their accumulations in voluntary supplemental retirement annuities (SRAs). When these are repaid, the accumulations remain available to support retirement income. If these are not repaid, they are subject to penalties and taxes and, most important, are lost from the tax-deferred retirement account.

In addition to these income and cash options, TIAA-CREF introduced in 1996 the ability for annuitants to make postretirement transfers (no more than once a year) among most of the CREF accounts and to TIAA, thus enabling them to change the source of their income throughout retirement. Although this is not an income option, it underscores that, today, TIAA-CREF participants and retirees face a large number of choices about their premium allocations, preretirement investments, annuity income, and annuity investments.

Results of Individual Choice

Some of TIAA-CREF's accumulating participants and retired annuitants have responded to these changes by choosing one or more of the new options for retirement savings, investment, and retirement income. We next summarize these responses and offer suggestions about the implications of this changing behavior.

We note, however, that TIAA-CREF's participants are concentrated in higher education and research institutions. Hence, they are not representative of the U.S. working population, nor are they fully representative of workers covered by pension plans. Further, these results are from the past, not the future. Therefore, they must be taken with the appropriate cautions before they are used to predict or even suggest how the entire future U.S. workforce might respond to similar options that could be part of private pension reform or social security privatization. For example, the full-time higher education workforce is older and has a higher proportion of women, than the rest of the full-time private sector U.S. workforce. Higher education employees are more likely to work in an institution that offers a pension plan than employees in other private sectors (94.5 percent to 71.5 percent). And they are more likely to participate in the pension plan (by 79.8 percent to 59.1 percent, the preceding numbers were computed by Mark Warshawsky and John Ameriks 1996, from the 1993 Current Population Survey). They also have higher working incomes, wealth, and retirement incomes than employees in other sectors. Of course, TIAA-CREF participants, by definition, have nearly 100 percent participation rates and so are even less representative of the

entire U.S. working population. But because of this latter difference, the TIAA-CREF experience does show how individuals *might* behave as defined contribution plans grow increasingly popular in the public and private sectors or under social security-sponsored individual retirement accounts.

Results of Individual Choice I: Retirement Savings

In defined contribution plans, retirement income depends on the choices individuals make about allocating their premiums and their accumulations, and then how all those savings perform as assets.

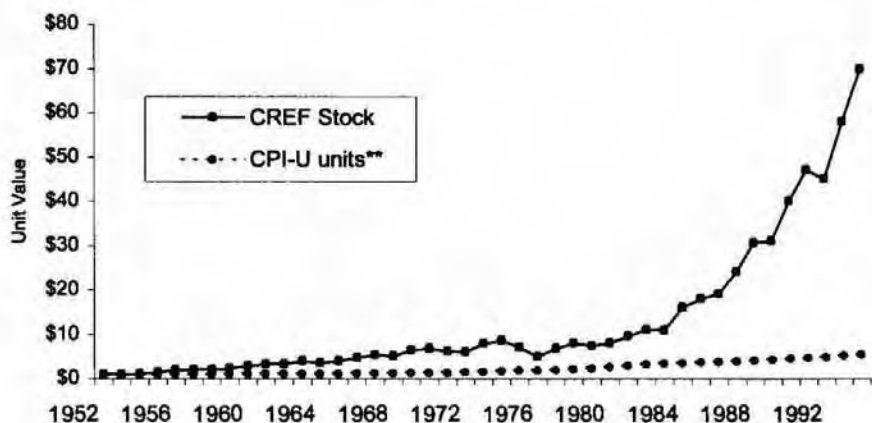
Returns on Accumulations. Overall, what is the investment experience with CREF variable annuities as retirement savings vehicles? Figure 1 shows that CREF Stock has outperformed inflation since 1952 by an average of 6.5 percent per year (investment experience with other CREF funds has been good to excellent, but they are too new to allow long-term measurement). Although CREF and TIAA (the fixed annuity) have enjoyed superior returns overall, both are subject to return variations. Figure 1 also shows that CREF stock accumulations failed to keep up with inflation during the 1970s and early 1980s. TIAA-CREF's participants and annuitants were directly affected: for those still saving for retirement, it reduced for a time the expected value of future retirement income based on pension savings and the earnings on those savings. Of course, it did offer the advantage of some valuable dollar cost averaging, and in fact CREF performed well in the 1980s and 1990s.

Savings Allocation Decisions. How have TIAA-CREF participants allocated their savings? Table 4 shows preretirement premium and savings accumulation allocations between TIAA and CREF over the past 25 years. Among other things, this table reflects long-term changes in the stock and bond markets. Poor performance of the stock market in the 1970s likely discouraged participants from holding assets or allocating premiums to CREF. As interest rates moderated and the stock market performed well in the 1980s, allocations to CREF began to increase.

We can also take a snapshot that shows how individual demographics affect the allocation choices people make. Table 5 shows preretirement saving and premium allocations for retirement plan participants by age, income, sex, occupation, and education. (These figures are from a 3,602-person sample of TIAA-CREF participants in 1993; the sample has been weighted to match key characteristics of all TIAA-CREF participants.)

Age. As might be expected, the average size of a participant's annual premium payments and accumulations increases with age, but the use of the CREF fund declines with age. The proportion of premiums going to all CREF accounts diminishes from 68 percent for those under age 35, to

**(1952 = \$1.00)



*(1972 = \$1.00)

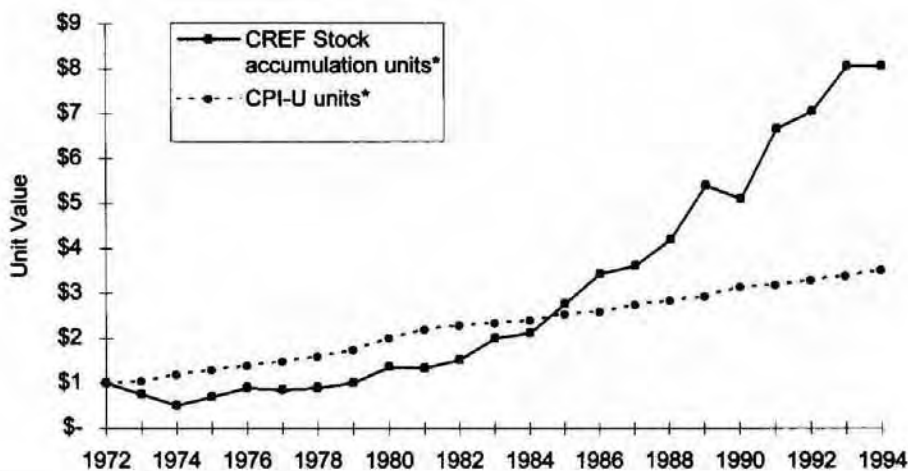


Figure 1. CREF stock and stock accumulation unit values versus inflation. Source: Authors' computations.

TABLE 4 Changes over Time in the Proportion of Premiums, Accumulations, and Annuity Income and Annuity Reserves Allocated Between TIAA and CREF, 1982-95

	<i>Accumulating annuities (%)</i>				<i>Payout annuities (%)</i>			
	<i>Premiums</i>		<i>Accumulating annuity reserves</i>		<i>Income</i>		<i>Reserves</i>	
	<i>TIAA</i>	<i>CREF</i>	<i>TIAA</i>	<i>CREF</i>	<i>TIAA</i>	<i>CREF</i>	<i>TIAA</i>	<i>CREF</i>
1982	57.6	42.4	49.8	50.2	74.4	25.6	58.9	41.1
1985	60.4	39.6	48.0	52	73.2	26.8	58.1	41.9
1990	54.4	45.6	52.1	47.9	72.9	27.1	64.6	35.4
1995	39.0	61.0	42.6	57.4	70.4	29.6	58.8	41.2

Source: Author's computations using TIAA-CREF data.

47 percent among those age 65 and above. Younger participants allocate a greater proportion of their accumulations to CREF, while older participants allocate greater percentages to TIAA.

Sex. Men's average total preretirement accumulations are more than double women's, although women's total annual premiums are about 70 percent of men's. Both men and women allocate a markedly higher proportion of their premiums and accumulations to variable annuities as compared to fixed annuities, although men allocate somewhat more than women to variable annuities. This difference, we believe, is a function of accumulation size as well as sex differences in risk aversion.

Occupation and institution type. Faculty and senior administrators strongly prefer CREF variable annuities to TIAA fixed annuities. Although their premium payments and accumulations are far lower than faculty and administrators, professional/technical staff make almost identical choices. Only clerical and maintenance staff prefer TIAA to CREF for their basic retirement plan. Only small variations in allocations, accumulation, and premium totals are evident by type of institution.

Household income. Total accumulations and premiums show a predictable increase with income, as does the preference for CREF. Although the preference for CREF varies with income, it is nearly universal. The only exception are households with income under \$25,000, where participants allocate about half their premiums and 53 percent of their assets to TIAA.

Education. Total accumulations, premiums, and the use of variable annuities all increase with education. More highly educated participants allocate a greater proportion of their funds to CREF.

Although not presented in this table, neither marital status nor the

TABLE 5 Percent of 1995 Accumulations and Premiums Invested by Non-Retirees in TIAA-CREF RA/ GRA Accounts by Selected Demographic Characteristics, 1993 (N = 3,602)

	<i>Average accumulations</i>	<i>Accumu- lations in TIAA (%)</i>	<i>Accumu- lations in CREF (%)</i>	<i>Average total premium</i>	<i>In TIAA (%)</i>	<i>In CREF (%)</i>
<i>Total</i>	\$115,402	44	56	\$ 7,000	38	62
<i>Age</i>						
Under 35	\$ 21,004	37	63	\$ 4,370	32	68
35 to 44	\$ 58,671	44	56	\$ 6,202	37	63
45 to 54	\$147,214	45	55	\$ 8,026	38	62
55 to 64	\$243,255	49	51	\$ 8,856	44	56
65+	\$290,552	57	43	\$ 9,653	53	47
<i>Sex</i>						
Men	\$160,697	41	59	\$ 8,277	35	65
Women	\$ 70,761	47	53	\$ 5,742	41	59
<i>Occupation</i>						
Teaching Faculty	\$158,798	42	58	\$ 8,064	37	63
Senior Admin.	\$156,942	43	57	\$ 9,405	36	64
Prof./Technical	\$ 74,697	44	56	\$ 6,315	37	63
Clerical Support	\$ 44,356	53	47	\$ 3,766	46	54
<i>Income</i>						
Under \$25K	\$ 21,829	53	47	\$ 2,550	50	50
\$25K-\$34K	\$ 28,285	45	55	\$ 3,898	41	59
\$35K-\$49K	\$ 62,864	46	54	\$ 5,073	39	61
\$50K-\$74K	\$102,541	44	56	\$ 6,285	39	61
\$75K-\$99K	\$147,784	42	58	\$ 8,088	35	65
\$100K+	\$224,514	40	60	\$11,699	34	66
<i>Risk tolerance</i>						
Substantial risk	\$ 89,011	25	74	\$ 6,276	20	80
Above average	\$106,975	35	65	\$ 7,171	28	72
<i>Risk</i>						
Average	\$125,623	49	51	\$ 7,034	44	56
Below average	\$119,775	62	38	\$ 7,018	58	42

Source: Author's computations using TIAA-CREF data.

presence of children seems to be associated with differences in allocation percentages.

This table is drawn from data on participants in the basic retirement plans at TIAA-CREF. Many participants also have the option of starting and maintaining a separate voluntary supplemental retirement annuity (SRA or a "tax-deferred annuity"), which is a voluntary salary reduction plan that uses the participant's before-tax dollars (subject to a \$9,500 per year limit or less, depending on other defined contribution plan usage). We combined the data from the 1993 survey with SRA data information, and detect variations in allocations similar to those for the basic retirement plan. However, for almost every variable, participants allocate more of their premiums and accumulations to CREF as opposed to TIAA. Allocations to CREF range from about 60 percent to about 75 percent. One hypothesis is that participants are more risk tolerant with their voluntary tax-deferred accounts than with their basic retirement accounts.

Retirement and Financial Education. Other than demographics, what might affect allocation decisions? At least one attitudinal characteristic does seem to affect behavior: participants' willingness to take on investment risk. Table 5 shows that participants willing to take on substantial risk (i.e., participants who are relatively risk tolerant) allocate over 80 percent of their premiums and over 70 percent of their accumulations to CREF, while those who are most conservative in their approach to risk allocate about 60 percent of their premiums and accumulations to TIAA.

In turn, risk tolerance may be affected by education, both by general education levels and by specific education about finance and retirement. It is likely that education about savings, risk, return, retirement annuities, and related concerns can help individuals make choices appropriate to their changing circumstances. The company has a long-standing commitment to and has made significant investments in participant education through brochures, books, seminars, individual counseling, sponsorship of financial programs on television and radio, retirement planning software, specific illustrations of retirement income for individuals, and other means. Although the exact effects of these programs are hard to measure, the company is known as a leader in retirement planning education.

As an example, TIAA-CREF suggests in its literature that many, if not most people will be able to balance risk and return by allocating half of their premiums to TIAA fixed funds and half to the CREF variable annuity funds. While participants do not, in the aggregate, allocate 50 percent of their premiums to CREF, they do tend to behave as one might predict. That is, younger, more highly compensated and educated risk takers, are more likely to allocate premiums and assets to CREF, while their opposites are more likely to put their funds into the fixed account.

Such a result suggests that, with substantial retirement-awareness education, people roughly follow the pattern that many financial planners think they should: allocate a greater proportion of retirement savings to higher-risk, higher-return stocks when younger and reduce those allocations with time. The one discordant note here is that lower-income and clerical/support staff allocate less of their premiums and accumulations to CREF than any other group.

Of course, it is difficult to draw a causal connection from this data, since these demographic variables are likely to be highly correlated and it is unclear how much of the variation we see is due to age versus cohort effects. The next step in this research will be to assess the relative contribution of each factor to allocation decisions. Another step should be to track more precisely the effects of demographic variables and risk tolerance over time.

Results of Individual Choice II: Retirement Income

A key question driving pension and social security policy is whether workers will be able to meet their retirement income goals, which could be defined as total retirement income that lasts as long as needed, that provides for a spouse or other beneficiaries in case the retiree dies first, and that is adequate in amount. In practice, a combination of an employer pension, social security benefits, and personal savings should enable a retiree to (1) provide income for the retiree's remaining lifetime, (2) have provisions for covering a beneficiary, and (3) replace an adequate portion of preretirement income.

Traditional lifetime annuity choices. While TIAA-CREF participants have traditionally chosen lifetime annuities when they retire, since 1990, some participants have elected to take advantage of other income options, such as minimum distribution, systematic withdrawals, IRA rollovers, and lump sum withdrawals. Although starting an annuity doesn't necessarily equal retirement, we know when TIAA-CREF participants choose to begin retirement annuities. Figure 2 and Table 6 show changes in TIAA-CREF annuity starting ages for both men and women over time. Reflecting general shifts in the U.S. economy and specific changes in laws affecting retirement, first-time annuitants have bifurcated: more are now older and younger than age 65. In 1979, nearly 42 percent of new annuitants were age 65, while in 1994 about 21 percent of new annuitants were age 65. However, since peaking at 18.8 percent in 1991, the proportion of participants age 70 and over starting payout annuities dropped to 14.8 percent in 1994 (due to the availability of the minimum distribution option, as described below). Although not required by law, two-life annuities have become more popular among all age groups since 1978. The popularity

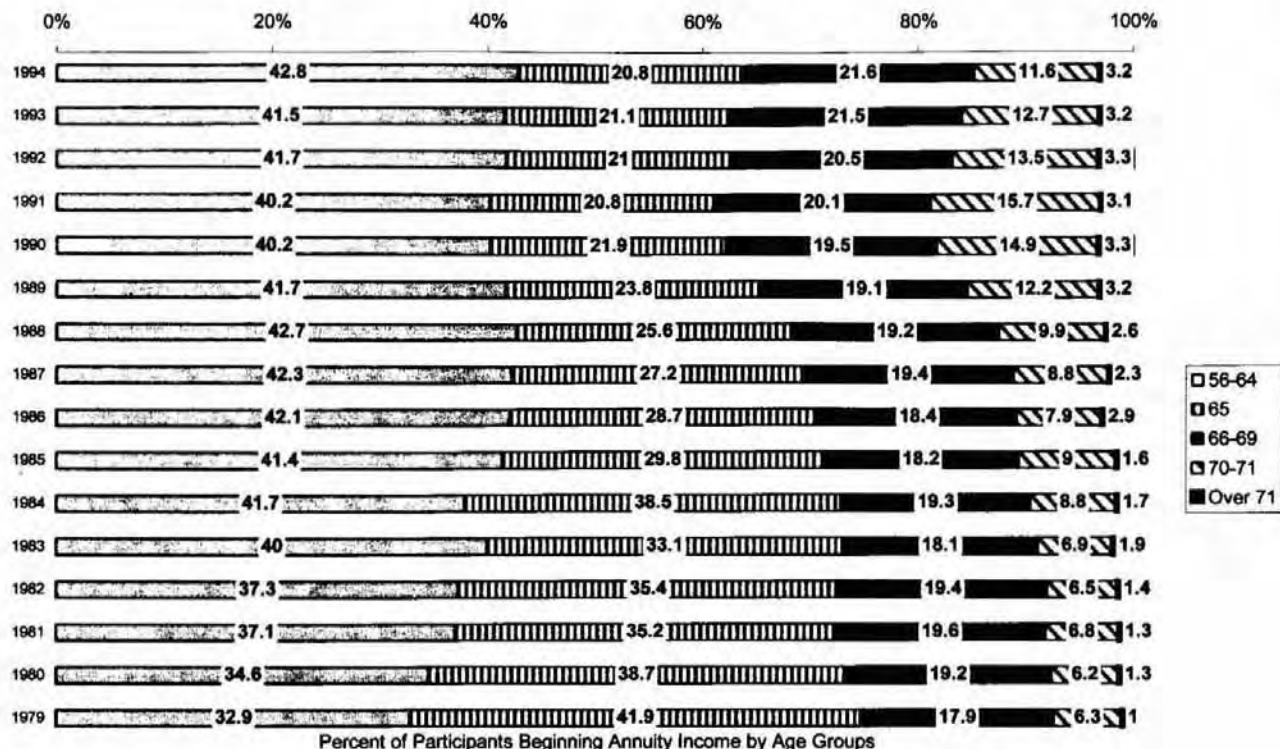


Figure 2. TIAA-CREF annuity income starting ages. Source: Authors' computations using TIAA-CREF data.

TABLE 6 Selection of One-Life and Two-Life Annuity Income Options by Age at Retirement

Age annuity started	Male primary annuitants (%)		Female primary annuitants (%)	
	One-life	Two-life	One-life	Two-life
1978	43.5	56.5	81.1	18.9
1983	36.8	63.2	73.1	26.9
1986	27.8	72.2	69.2	30.8
1990	25.6	74.4	66.0	34.0
1994	26.0	74.0	67.8	32.2

Source: Author's computations using TIAA-CREF data.

of one-life annuities has declined, but they remain relatively popular among younger male retirees. Women are more likely than men to choose one-life annuities at all ages. In addition, there is a wealth effect in annuity choice: annuitants with larger total accumulations are more likely to select two-life annuities than those with smaller totals.

New Income and Cash Options. Finally, and most important, significant changes have occurred in participants' preference for nontraditional income options. Recalling that the percentage of participants starting one-life or two-life annuities dropped between 1991 and 1994, Table 7 combines for those years the numbers of TIAA and CREF life annuity and minimum distribution option (MDO) contracts issued. MDO contracts were first offered in 1991 as an alternative way of dealing with federal requirements that participants reaching age 70½ begin to take a minimum distribution. Since then, MDOs have grown from 2.2 percent of total TIAA income contracts issued to 17.3 percent in 1994, while CREF MDOs have increased from 3.4 percent of all contracts in 1991 to 21.2 percent in 1994. Total MDOs increased by 49 percent from 1993 to 1994. MDOs issued where no other premiums are being paid under the employer plan—a presumption that the recipient is truly retired or is now working at a non-TIAA-CREF employer—totaled 12.2 percent of TIAA contracts and 15 percent of CREF contracts issued in 1994 (King 1996).

Even for those taking traditional income options, the use of the TIAA graded method and CREF have both increased at the expense of the TIAA standard payout method. A separate analysis reveals that this change may reflect an interest in inflation protection and the ability of people with larger accumulations to take a reduction of income in the short run in exchange for an increase in income later on.

Similarly, the use of transfer payout annuities (TPAs) has increased rapidly since their introduction in 1991. This is a popular vehicle for

TABLE 7 TIAA and CREF Life Annuity and Minimum Distribution Contracts Issued

Type of contract	1990		1991		1992		1993		1994	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<i>TIAA (total)</i>	20,400		21,558		22,197		20,860		21,296	
Standard		93.4		90.7		82.4		78.4		70.9
Graded		6.6		7.1		8.8		9.7		11.7
Minimum distribution		—		2.2		8.8		12.0		17.3
<i>CREF (total)</i>	8,877		9,801		11,538		12,073		13,616	
Stock		93.6		89.2		81.2		76.8		67.6
Money market		6.4		7.0		5.3		4.4		3.7
Social choice		—		0.3		0.9		1.9		1.9
Global		—		—		<0.1		1.5		5.2
Growth		—		—		—		—		0.3
Equity index		—		—		—		—		0.1
Minimum distribution [†]		—		3.4		12.2		15.3		21.2

Source: Author's computations using TIAA-CREF data.

Note: Except for payments under the Minimum Distribution Option, all contracts are for Immediate Life Annuities.

*Percentages in the Minimum Distribution subgroups may not add to totals because of rounding.

[†]Includes Minimum Distributions from all types of CREF accounts.

moving accumulation from TIAA to CREF over a ten-year period. TPAs also allow individuals to receive payments directly or to transfer funds to another pension provider. In 1994, about 13 percent of TPAs were used to transfer accumulations to another pension provider, 16 percent took direct cash payments, and the rest transferred to a CREF variable annuity account. Since only 2 percent of all 1994 TPA cash participants also settled a portion of their accumulations as life annuities, taking cash through this method seems to be, in most cases, an alternative to a traditional annuity.

In the 1990s, TIAA-CREF's participating institutions have been allowed to offer participants the option of removing funds from accumulating (preretirement) contracts. Overall, approximately 80 percent of institutions allow individuals to withdraw all accumulations after terminating employment, while another 5 percent allow partial withdrawals. In addition, within legal, institutional, and TIAA-CREF guidelines, individuals at most institutions may receive funds from CREF accounts by transferring them to another carrier's retirement plan or by rolling them over to an IRA (since 1991). Finally, participants may take a direct cash withdrawal from an SRA (beginning in 1990 for people no longer working at the college concerned and in 1993 for some people still working). Cash withdrawals and some IRA rollovers (which then allow individuals to take cash without the withholding penalty) represent funds being removed from retirement savings, thus diminishing the amount of money available to support a participant's retirement annuity. As with MDOs and TPAs, the use of these options has increased in the past few years.

In sum, TIAA-CREF has traditionally offered and encouraged its participants to take lifetime payout annuities. The growing popularity of two-life annuities supports the goal of spousal coverage and the growing popularity of the TIAA graded method supports the goal of inflation protection. However, as nonlifetime annuity options have become available, there has been a rapid increase in their use. This trend suggests, at least in the short run, that a proportion of participants are interested in removing cash from their tax-deferred savings prior to retirement and in receiving income that is not guaranteed for life after retirement. Offsetting this, as we will see below, are increases in the average accumulation size, which may allow some individuals to take cash and still replace a significant portion of their preretirement income through traditional annuities.

Through new non-traditional income and lump sum options, traditional annuities could begin to be affected by adverse selection. Warshawsky and Friedman (1990) have shown that adverse selection does play a role in the choices individuals make. Depending on the flexibility

offered in a retirement plan—that is, opportunities for exercising adverse selection—it could affect the entire pool of annuitants. With its large pool of 1.8 million participants and annuitants, TIAA-CREF's traditional annuities have not been affected by new options. However, the design of pension reforms, including private pension systems as well as possible social security privatization, will need to confront demands by participants for flexibility in income and cash options (Mitchell and Zeldes 1996).

TIAA-CREF retirement income experience. Although TIAA-CREF variable annuities have for most periods performed well, payments have varied along with market performance. For example, prior to the 1970s and again in the 1980s, people did very well with accumulating and payout annuities based on CREF. But as Figure 1 shows, CREF annuity income rates dropped seven times between 1972 and 1982. Since that time, CREF annuity income rates have risen substantially and, over the long haul, have provided a good, if variable source of income for retirees depending on their savings rate and the length of time they were able to accumulate assets. Thus, participants and annuitants who rely on variable annuities are not immune from ups and downs in the real value of their portfolios.

Other things being equal, initial annuity-based retirement income can be a good predictor of later retirement income. Figure 3 shows, for new annuitants, the average annualized initial annuity payments for TIAA, CREF, and the total for TIAA and CREF for each year from 1980 to 1994. The average total initial payment has increased by 10.9 percent per year, well ahead of inflation over that time. For 1992–1994, however, the increase is only 2.6 percent per year; this reflects increased use of CREF annuities and the TIAA graded method, which use an initial interest rate assumption of 4 percent (lower than the TIAA standard method initial interest rate for the same period). For example, the proportion of new annuitants selecting the TIAA graded method or CREF variable annuities increased from 45 percent in 1990 to nearly 60 percent in 1994. Figure 4 further shows the relationship between size of accumulation and preference for CREF payout annuities in 1994. As size of accumulation rises, so does the preference for CREF payout annuities and the TIAA graded method.

Initial and subsequent retirement income also depends on the size of accumulation at retirement, as well as subsequent earnings on that income. Based on a survey of TIAA-CREF retirees, Table 8 provides a snapshot for 1993 of retirees' annualized annuity income (payments were annualized for those individuals who started a payout annuity during 1993) and "average payout reserves" (i.e., a present value, actuarial calculation that is the functional equivalent of remaining assets or accumulations). These numbers do not indicate what proportion of pre-

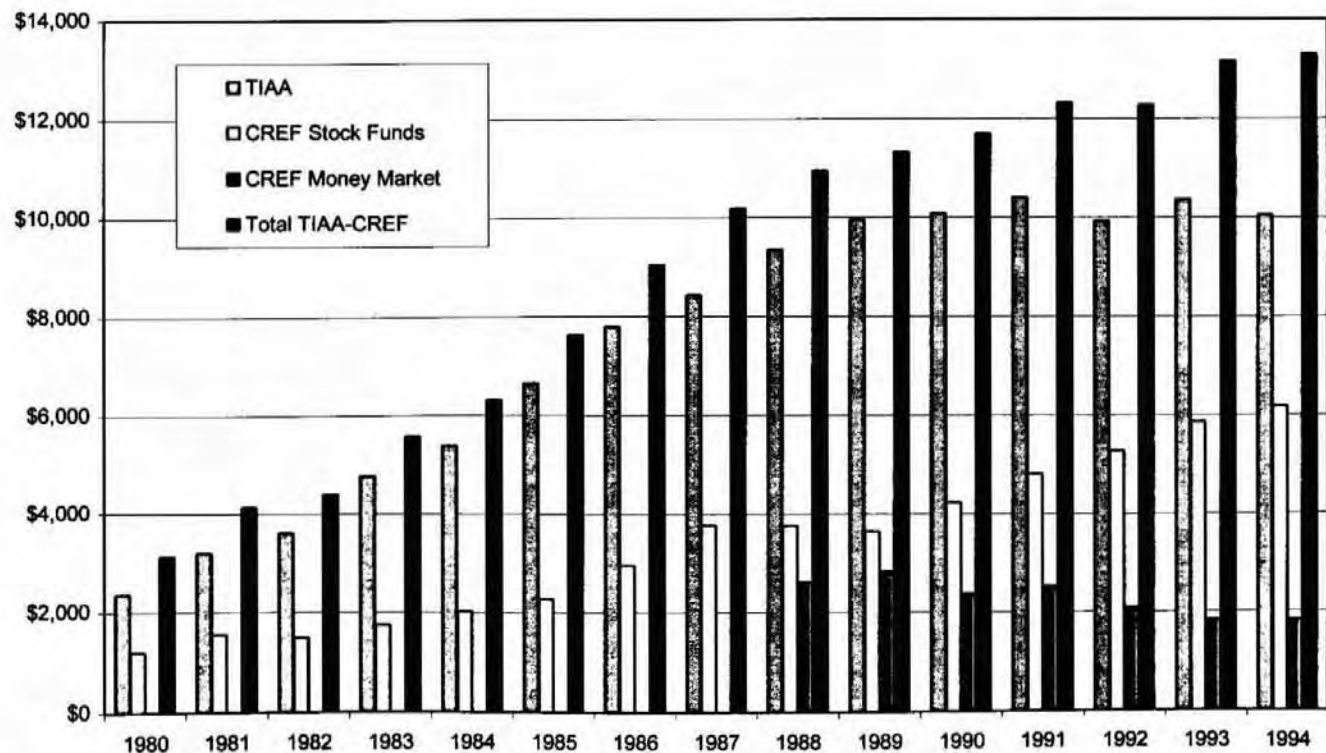


Figure 3. Average TIAA-CREF initial annuity payment per person, 1980–94. Source: Authors' computations using TIAA-CREF data.

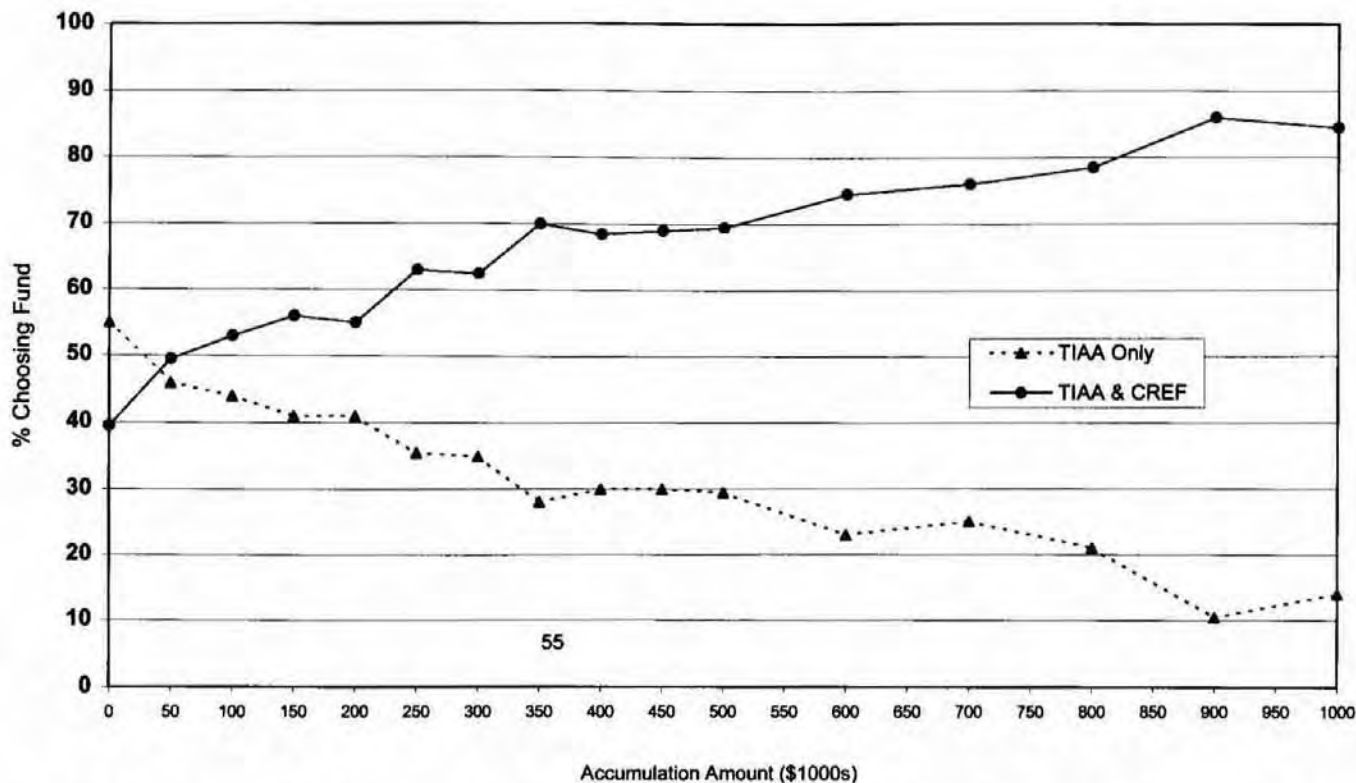


Figure 4. Payout annuity fund elections by accumulation amount (average 1994 accumulation: TIAA, \$124,160; TIAA-CREF \$210,000). Source: Authors' computations using TIAA-CREF data.

TABLE 8 Estimated Annualized Annuity Payouts and Total Reserves from TIAA and CREF Accounts by Selected Demographic Characteristics, 1993

	<i>Average annualized annuity payments</i>	<i>% Average annualized TIAA payments</i>	<i>% Average annualized CREF payments</i>	<i>Average payout reserves</i>	<i>% Average TIAA payout reserves</i>	<i>% Average CREF payout reserves</i>
<i>Total</i>	\$11,677	66.9	33.1	\$114,029	58.7	41.3
<i>Age</i>						
Under 65	\$10,733	76	24	\$125,237	68.3	31.7
65 to 70	\$11,703	74.5	25.5	\$127,262	65.1	34.9
71 to 75	\$14,071	72.5	27.5	\$136,258	63.4	36.6
76+	\$10,103	50.3	49.6	\$ 82,138	39.4	60.6
<i>Sex</i>						
Men	\$15,186			\$152,459		
Women	\$ 7,976			\$ 73,487		
<i>Education</i>						
Some College	\$ 5,751			\$ 53,833		
College Graduate	\$ 9,736			\$ 98,712		
Post Grad Work	\$11,392			\$111,415		
Masters Degree	\$10,294			\$ 98,609		
Doctorate	\$16,893			\$169,432		
Professional	\$22,503			\$229,601		
<i>Total household income/annuity payments as of % of Total Income</i>						
Under \$25K	\$ 4,219	≥18%		\$ 36,840		
\$25K–\$34K	\$ 7,262	21–29%		\$ 67,876		
\$35K–\$49K	\$10,773	22–31%		\$106,137		
\$50K–\$74K	\$14,740	20–29%		\$148,198		
\$75K–\$99K	\$20,318	21–27%		\$207,651		
\$100K +	\$25,770	≤26%		\$250,284		

Source: Author's computations using TIAA-CREF data.

retirement income is being replaced, but annualized TIAA-CREF income is seen to represent only about 20 to 30 percent of total reported household income in 1993, for nearly all income groups. We speculate that social security income represents a substantial proportion of the remaining income for lower-income annuitants, while other income sources—earned income, other private pensions, and personal savings—contribute to the total for higher-income annuitants.

Annuity income for these retirees is split about two-thirds to one-third between TIAA and CREF annuities, and the split varies little by demographic characteristics. The exception seems to be people aged 76 and

TABLE 9 Average Household Wealth Held in Tax-Deferred Accounts Among Retired TIAA-CREF Annuitants, 1995

	<i>Owned</i>	<i>If owned, assets held in . . .</i>			<i>Total invested</i>
		<i>Stock</i>	<i>Fixed-income</i>	<i>Cash</i>	
401(k) salary reduction plan	(n=28)	47%	47%	7%	\$155,661
TIAA-CREF individual annuities	(n=477)	36%	63%	1%	\$132,763
403(b) salary reduction plan	(n=31)	38%	61%	1%	\$86,441
Other thrift savings plans	(n=58)	58%	25%	22%	\$75,258
Individual retirement account	(n=319)	56%	22%	22%	\$72,231
Other tax-deferred annuities	(n=162)	22%	48%	30%	\$67,091
KEOGH account	(n=18)	49%	29%	22%	\$52,017
Average, all respondents					\$100,254
Average, all respondents (non-TIAA-CREF)					\$75,081

Source: Author's computations using TIAA-CREF data.

Notes: Number of persons reporting any amount in parentheses. Persons reporting a total amount for an account type but reporting no amount for an asset class within the account are assumed to hold \$0 in that asset class for purposes of calculating above averages. Totals are averages over account types within each asset class, weighted by the number of persons reporting a total for each account type.

older who derive a larger proportion of their income from CREF annuity contracts (of course, annuitants whose responses are reflected in this table could choose how to allocate their retirement reserves only at the time a payout annuity was established). The overall conclusion is that annuitants tend to diversify risk. Based on other data, nearly 95 percent of CREF stock participants chose to balance the volatility of the variable annuity by electing the fixed annuity (TIAA) as part of their retirement portfolio, while nearly 54 percent of TIAA participants choose to diversify into CREF.

Annuitants may also diversify their other retirement assets. Preliminary responses to a November 1995 survey of the assets reported by 487 retired annuitants show that reported assets held in TIAA and CREF appear roughly comparable to the average totals and percentages as measured by company records. However, as Mitchell (1988) has shown elsewhere, self-reports on retirement plans can be inaccurate. In any event, the TIAA annuitants report total household assets of \$581,355, including \$200,000 in real estate holdings, and net worth of \$555,213. Turning to retirement-related assets, Table 9 provides average household wealth reported by these respondents for a range of tax-deferred accounts, including TIAA-CREF. The number of individuals reporting that they hold an asset is given in parentheses. One interesting result is that although their

TIAA and CREF assets are split two-thirds to one-third in favor of fixed annuities, respondents report that they hold a greater proportion of their other retirement wealth in variable (e.g., stock) funds. The survey also shows that 47 percent of these same respondents hold stocks and 47 percent (not necessarily the same people) hold stock mutual funds, while 30 percent hold bond mutual funds and 80 percent hold corporate bonds. In addition, about a third of the annuitants surveyed say they are covered by a defined benefit plan and 17 percent report that their spouse is likewise covered. Aside from employer plans, individual retirement accounts are the most popular form of personal retirement savings. Sixty-five percent of annuitant households surveyed list IRA assets. Unfortunately, we do not yet know whether people who hold one kind of asset are more or less likely to hold another kind of asset. Still, it is likely that these annuitants diversify their retirement assets as well as other assets they hold.

Other data show that there are distinct differences between male and female annuity income-related behavior, but this is mainly due to differences in time spent in the accumulation phase. In 1994, males in our sample used on average over \$200,000 to purchase payout annuities, over twice as much as women that year. Females comprised over 40 percent of the total population who annuitized in 1994, but they represented less than 10 percent of those who annuitized an amount over \$500,000. These proportions have remained roughly the same (in real terms) since the early 1980s.

Size of accumulation depends most on length of time spent in the our pension system. Women spend less time (17 years on average) in the accumulation phase than men (23 years). Thus, male annuitants are likely to have higher accumulations, even in those cases where salary histories are comparable. Table 10 shows the distribution of new annuitants in 1994 according to time in the TIAA-CREF system. Women are far more likely than men (44.5 percent to 25 percent) to have been in system 15 years or less when they start an annuity. In recent years, however, the proportion of females starting new annuity contracts has increased, and there is some evidence that they remaining in the system longer than they did previously. Thus, the male-female split in annuity payouts may begin to migrate toward equality in the future. The lesson is that in a defined contribution, variable annuity setting, time spent in the accumulation phase is crucial to income adequacy. Factors affecting time spent accumulating include the age at which a person begins accumulating savings, the age of retirement, and the time during which retirement saving is suspended (e.g., sabbatical, unemployment or employment outside of a pension plan, family obligations, etc).

TABLE 10 Distribution of TIAA-CREF Annuitants by Years in TIAA-CREF Systems—1994 Issues

Years in system	Male annuitants		Female annuitants		All annuitants	
	Percent of annuitants	Cumulative percent of annuitants	Percent of annuitants	Cumulative percent of annuitants	Percent of annuitants	Cumulative percent of annuitants
0-5	5.07	5.07	6.97	6.97	5.84	5.84
6-10	9.72	14.79	16.82	23.79	12.59	18.43
11-15	10.31	25.10	20.71	44.50	14.52	32.95
16-20	11.98	37.08	22.70	67.20	16.32	49.27
21-25	18.52	55.60	17.90	85.10	18.27	67.54
26-30	21.39	76.99	9.12	94.22	16.42	83.96
31-35	14.64	91.63	3.96	98.18	10.32	94.28
36-40	6.72	98.35	1.39	99.57	4.56	98.84
41-45	1.53	99.88	0.40	99.97	1.07	99.91
46-50	0.12	100.00	0.03	100.00	0.09	100.00
Total	100.00		100.00		100.00	

Source: Author's computations using TIAA-CREF data.

Costs

In addition to individual behavior and annuities, a issue critical to the retirement adequacy question is how much it costs individuals for pension asset management. This is especially important because even relatively small charges have a significant effect on accumulations. For example, over a 30-year accumulation period, an individual could invest \$100 per month in an account with an annual expense fee of .35 percent, and the same amount in an account with a 1 percent annual expense charge—with both funds earning the same 10 percent per annum. The account with the lower expense fee would yield \$22,852 more.

Variable annuities are expensive when compared with mutual funds, but they do offer additional products and services, so, direct cost comparisons must be made carefully. Table 11 shows average annual expense charges for variable annuity accounts and mutual funds. A small number of variable annuity accounts have no surrender charge and a few have a front end load. About a third of mutual funds have a front or back end load. Even so, the basic investment management fees for mutual funds and variable annuities are similar. But the extra insurance feature makes annuity product fees average more than double those for mutual fund products. Variable annuities include insurance for the risk of providing lifetime income (i.e., in managing a population of annuitants, there is unpredictability associated with future mortality). Some variable annuities also guarantee principal and offer other features. But the most

TABLE 11 Average Expenses for Variable Annuities and Comparable Mutual Funds by Objective, 1996 (does not include sales charges, withdrawal charges, or annual contract charges)

	<i>Variable annuities</i>			<i>Mutual funds</i>	<i>CREF</i>
	<i>Fund expense</i>	<i>Total insurance expense</i>	<i>Total expenses</i>	<i>Total expense</i>	<i>Total expense</i>
Equity index	—	—	—	0.53	.30
Growth	0.82	1.25	2.07	1.13	.37
Growth and income	0.64	1.26	1.91	0.97	.32
International stock	1.10	1.26	2.35	1.56*	.40
Balanced	0.79	1.26	2.06	1.08	.31
Corporate bond	0.68	1.24	1.92	0.93	.29
Money market	0.51	1.26	1.78	0.65	.29
Average†	0.79	1.27	2.06	1.06‡	.33

Source: Morningstar (1996) Lipper (1996)

*Global Funds

†Average includes types of funds not shown

‡Excluding Equity Index

interesting issue is that the fee variation among variable annuities is far greater than the variation between variable annuities and mutual funds; thus, variable annuity expense rates range from 0.29 percent to 3.43 percent per year. Some annuity issuers are able to charge rates that are less than a tenth of the most expensive rates. Variable annuities would be very attractive as vehicles for social security individual accounts, if they were to be managed for fees at the low end of scale. At the high end of the scale, savers would experience considerable erosion of earnings.

How is possible to manage variable annuities with a cost structure near the bottom of the scale, even below average mutual fund fees, like TIAA-CREF does? Table 11 shows total expenses for the CREF variable annuity accounts, and, CREF account expenses also compare favorably with mutual fund expenses. This is probably because CREF funds are internally managed, are committed to low sales and marketing costs (such as low advertising costs and the absence of a sales force with commissions), have economies of scale in investment management, enjoy nonprofit status, and avoid some of the insurance charges associated with other variable annuities.

Variable Annuities as Part of the TIAA-CREF System

Variable annuities, the CREF side of TIAA-CREF, are now the largest part of the nation's largest private retirement system. Experience shows that

TIAA-CREF participants face a large number of choices about whether and how to use variable annuities for savings and income. Currently, the range of choices could be seen as confusing or even overwhelming, but, in general, individuals seem to have made sensible choices within the limits imposed by law, employers, and the plan structure itself.

This conclusion should be tempered in two ways. First, as alternatives to traditional annuities and annuitization have appeared, people have begun to take advantage of opportunities to take money out of TIAA-CREF's retirement system. Some portion of this money is being used for current consumption or in lieu of a lifetime annuity. Second, since most of the increase in options for investment choice and for taking nonannuity funds has appeared within the last 10 years or less, it is too early to tell how these new options will affect retirement income adequacy several decades from now.

Implications for Pension Policy

This chapter began with a set of questions about variable annuities and how experience with them might inform private pension policy. Among other things, the recent pension simplification bill extends the use of defined contribution pension savings to nonprofit organizations and small employers. It also limits requirements that older workers begin to draw down their retirement savings at age 70, and it encourages pension portability for workers who change jobs.

But like most of the public attention paid to pensions in recent years, it focuses primarily on the savings side of the pension equation. Consequently, despite the growing popularity of variable annuities, many people in defined contribution pension plans receive little encouragement and education regarding retirement income options. The questions addressed in this chapter argue for an additional pension policy focus on the retirement income side of the equation. Specifically, public policy should encourage annuitization as a mechanism for receiving retirement income as an important component of the shift toward individual responsibility for retirement. At the very least, this will help avoid the impact of mortality illusion—that is, an increasing number of people outliving their retirement savings. With support for annuitization, variable annuities can be a powerful means of linking retirement security and individual choice.

Can defined contribution pension plans replace the insurance component of defined benefit pension plans? There is an inherent tradeoff between the built-in insurance component of defined benefit pension plans, where the employer bears much of the risk of providing adequate retirement income, and the freedom of choice associated with many defined contri-

bution pension plans where the individual bears these risks. On the one hand, defined benefit plans reduce participants' exposure to market risk, investment risk, inflation risk, mortality risk, and other risks. On the other hand, defined contribution plans offer the opportunity to obtain higher returns associated with equity investment, and they avoid the larger and longer-term risk that individual companies might devalue or not honor their promises.

Variable annuities are designed to provide many of the insurance guarantees promised by defined benefit plans, while retaining individual choice about investments. Variable annuities can be purchased that protect against risks such as mortality and loss of principal. Few variable annuities currently provide inflation protection as currently designed. Most of all, variable annuities can be designed to provide guaranteed lifetime or term income and are thus superior to mutual funds in these respects.

What should workers pay for management of their retirement funds, both before and after retirement? The biggest drawback to variable annuities is their cost, which averages twice that of the typical mutual fund. However, the lowest-cost variable annuities (e.g., TIAA-CREF) and mutual funds (e.g., Vanguard) are about a third of the average cost of mutual funds, mainly because of low marketing and sales expenses. If other providers can find ways to limit such expenses, variable annuities could become an even more attractive vehicle for retirement savings and income. Unfortunately, the difficulty for some providers may be constitutional: reliance on a sales force structure that builds costly commissions into expense charges.

What policies are necessary to ensure adequate retirement income in a defined contribution system? If adequacy is defined as a lifetime retirement income that replaces a significant proportion of preretirement income, then the TIAA-CREF experience illustrates the importance of variable annuities in assuring adequacy. Aided by pension law, TIAA-CREF actively encourages employers and employees to save regularly and steadily, to invest those savings in well-managed, low-cost funds, and then to purchase retirement annuities that guarantee lifetime income. On the other hand, some people will opt out of a lifetime or even a long-term retirement income in favor of cash if given the chance. Since few people have good information about their own mortality, some will live longer than their assets and thus could become a burden on the rest of society. Although an economic analysis of the costs and benefits to society of allowing relatively easy access to retirement cash is beyond the scope of this chapter, there is a need for policy-oriented analysis and discussion that focuses on the retirement income side of the pension equation, not just on the savings side. Future pension policy should go beyond concerns such as adequate savings, nondiscrimination, portability, and investment issues,

in order to address the need for lifetime income, availability of annuities and their design, limits on removing funds from retirement accounts prior to annuitization, limits on retirement income options other than lifetime annuities, and retirement savings, investment, payout income education, and cost control.

How should Americans choose to receive retirement income? An era of individual responsibility for retirement is just that: Americans are increasingly on their own, rather than dependent on an employer or—if Social Security is privatized—on the federal government, to ensure an adequate retirement income for life. The TIAA-CREF experience suggests that it is possible to design a private retirement system that permits individual choice, when the choices include a range of savings vehicles, well-managed funds, and sensible retirement income options. But we also have argued that much education is needed to support annuitization, and adverse selection probably raises the cost of privately purchased annuities.

How can we educate Americans to make the "right" choices? The U.S. Department of Labor has actively encouraged employers to increase the level and amount of pension and investment education provided to defined contribution pension participants. Here, too, the emphasis has been on adequate savings and the risks and returns on investment choices. TIAA-CREF's experience shows that education works, at least for most people, regarding the retirement payout side as well as the savings side. Payout issues must be central to any pension reform program involving increased individual responsibility.

What is the best way to insure that retirement accounts are portable? American workers today perceive that job changes may be more likely than in the past, so pension portability is a way to accommodate these changing realities and perceptions. TIAA-CREF pioneered pension portability and has been able to adapt it to changing circumstances, including the presence of other carriers in its market.

Conclusion

The current trend to allow Americans to remove funds from their private pensions for important purposes (housing, college, or hardships) undermines pension plans' ability to provide adequate retirement income. Even more important, proposals to reform the social security program to replace part of the current defined benefit system with a system of individual investment accounts exposes participants to a host of new risks. For instance, to ask all Americans to bear investment and market risks and then be willing to live with the results is unrealistic. The few or many who suffer under this system will undoubtedly attract considerable sym-

pathy when markets experience a downturn. Even more, should we support pension reforms that make it likely some *will* suffer the consequences of their actions? There is no solution that allows for complete freedom, but that ensures complete protection. The appropriate balance may be to encourage education and wise choice prior to retirement, and to provide strong mechanisms, such as annuitization, for ensuring continuing retirement income when individuals are less likely to have the financial flexibility to make up for income. Future pension reform must give attention to the sorts of risks, individual behaviors, and protection policies that have been confronted in the TIAA-CREF experience.

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